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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,221	04/16/2004	Johannes Mathias Theodorus Antonius Adriaens	081468-0308940	7266
909	7590	04/06/2006	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP			LYONS, MICHAEL A	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	
			2877	

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/825,221

Applicant(s)

ADRIAENS ET AL.

Examiner

Michael A. Lyons

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>082704</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Drawings***

The drawings are objected to because, while they are generally formal, Figures 1 and 2 still contain hand-drawn element labels. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: there is nothing in the claim that links the determination of displacements and the determination of interferometer model parameters that causes the interferometer to be calibrated. As such, it is unclear as to whether one of the steps, individually, is used to calibrate the interferometer, or if both steps, combined, calibrate the interferometer, or if it is another step independent of what has already been claimed.

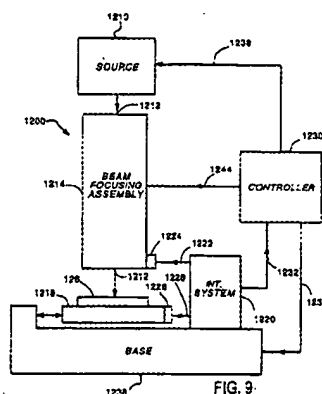
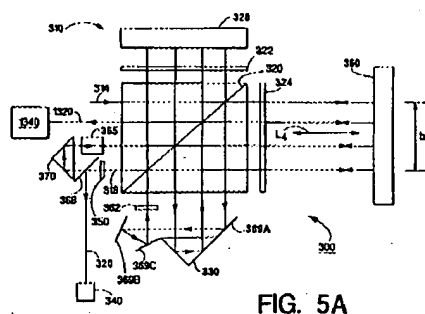
Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-9 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Hill (6,906,784).



Regarding claim 1, Hill (Figs. 5A and 9) discloses a lithographic projection apparatus, the apparatus comprising a radiation system 1210 that provides a beam of radiation, a support in the form of beam focusing assembly 1214 that patterns the beam of radiation 1212 according to a desired pattern a substrate table 1218 that holds substrate 126, and an interferometric displacement measuring system 1220 (see Fig. 5A for more detail) that measures displacement of a moveable component of the apparatus (that being the substrate table) and comprising a model (for example, equation 53 or 54) that relates to the amplitude of the measurement beam, the model including a correction term that is a function of a variable representing beamshear of a measurement beam (see equations 55-58).

As for claim 2, Hill discloses reference mirror 328 as a fixed part of the interferometric displacement measuring system and a measuring mirror 360 that can be fixed to the moveable component 1218, with the variable representing beamshear (equations 55-56) being proportional to “the changes in orientation of plane mirror 360 in the plane and orthogonal to the plane, respectively” (Col. 19, lines 28-30).

As for claims 3 and 6, beamshear variable equations 55-58 are correction terms that are taken from measurements that represent displacement of the measurement object in more than one degree of freedom, as the interferometer of Figure 5 monitors more than one direction (Col. 17, lines 24-35).

As for claims 4-5, see equations 53-58.

As for claim 7, the substrate table 1218 is the moveable component.

Regarding claim 8, Hill (Figs. 5A and 7-9) discloses a device manufacturing method using a lithographic projection apparatus, the method comprising providing a substrate 126 to be

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etched, providing a beam or radiation 1212 using a radiation system 1210, using a patterning device located within beam focusing assembly 1214 to endow the projection beam with a pattern in its cross-section, projecting the patterned beam of radiation onto a target portion of the layer of radiation-sensitive material (see Figs. 7 and 8 for more detail), and measuring displacements of a moveable component (that being the substrate table 1218) of the lithographic projection apparatus using an interferometric displacement measuring system (see Fig. 1) that comprises a model (for example, equation 6 or 9) that relates to the amplitude of the measurement beam, the model including a correction term that is a function of a variable representing beamshear of a measurement beam (see equations 7 and 8 12 and 13).

Regarding claim 9, Hill (Figs. 1 and 5A) discloses an electronic processor 80 and a computer 82 (inherent to the device of Fig. 5A) that is capable of executing a program code that calculates displacements of moveable object 360 (or stage 1218 in Fig. 9) in a lithographic projection apparatus from sensor measurements of an interferometric displacement measuring system and calculates, using, for example, equation 53 or 54, a correction term that is a function of a variable representing beamshear of a measurement beam (see equations 55-58).

Allowable Subject Matter

Claim 10 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter:

As for claim 10, the prior art of record, taken alone or in combination, fails to disclose or render obvious a method of calibrating an interferometer for measuring displacements of a moveable object in a lithographic projection apparatus, the method comprising determining

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displacements as a function of state-rotation and stage position, and determining interferometer model parameters, including coefficients for terms dependent on a variable for beamshear of a measurement beam, using a least square fit, and using these determinations to calibrate the interferometer, in combination with the rest of the limitations of the above claim. It should be noted that these reasons for allowability include an additional step of using what is determined by the current claim to calibrate the interferometer (see the 112 rejection above). The prior art fails to show the determination of the interferometer model parameters, the parameters including indication of beamshear, using a least square fit.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lyons whose telephone number is 571-272-2420.

The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAL
March 23, 2006



**HWA (ANDREW) LEE
PRIMARY EXAMINER**